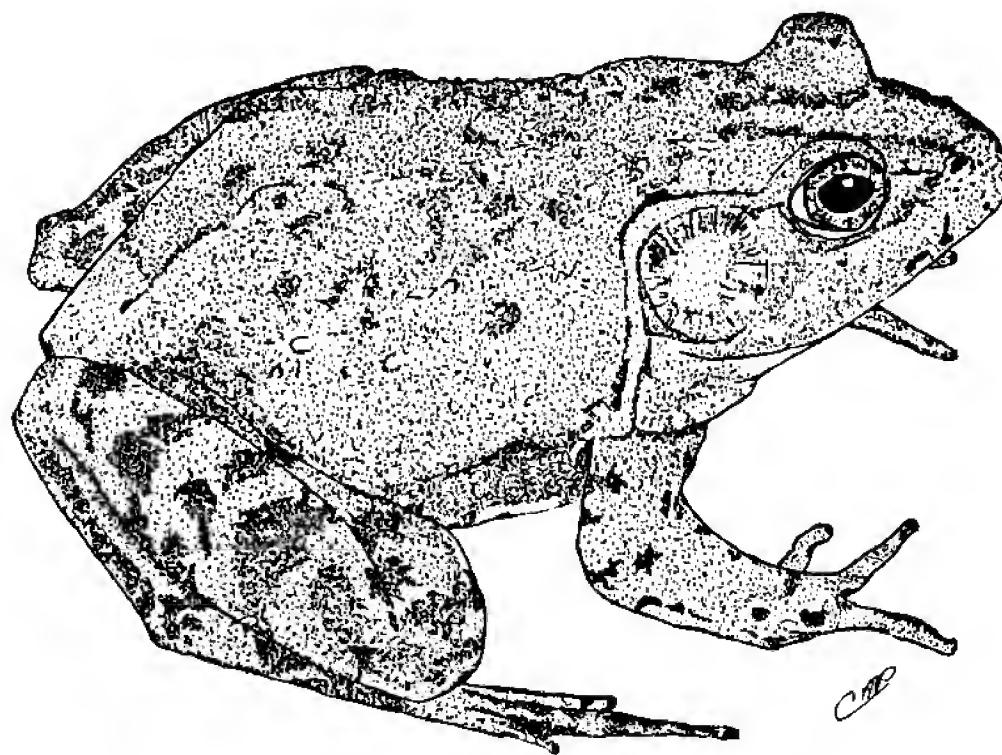


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JOURNAL INFORMATION

Catesbeiana is published twice a year by the Virginia Herpetological Society. Membership is open to all individuals interested in the study of amphibians and reptiles and includes a subscription to *Catesbeiana*, two newsletters, and admission to all meetings. Annual dues for regular membership is \$15.00. Payments received after September 1 of any given year will apply to membership for the following calendar year.

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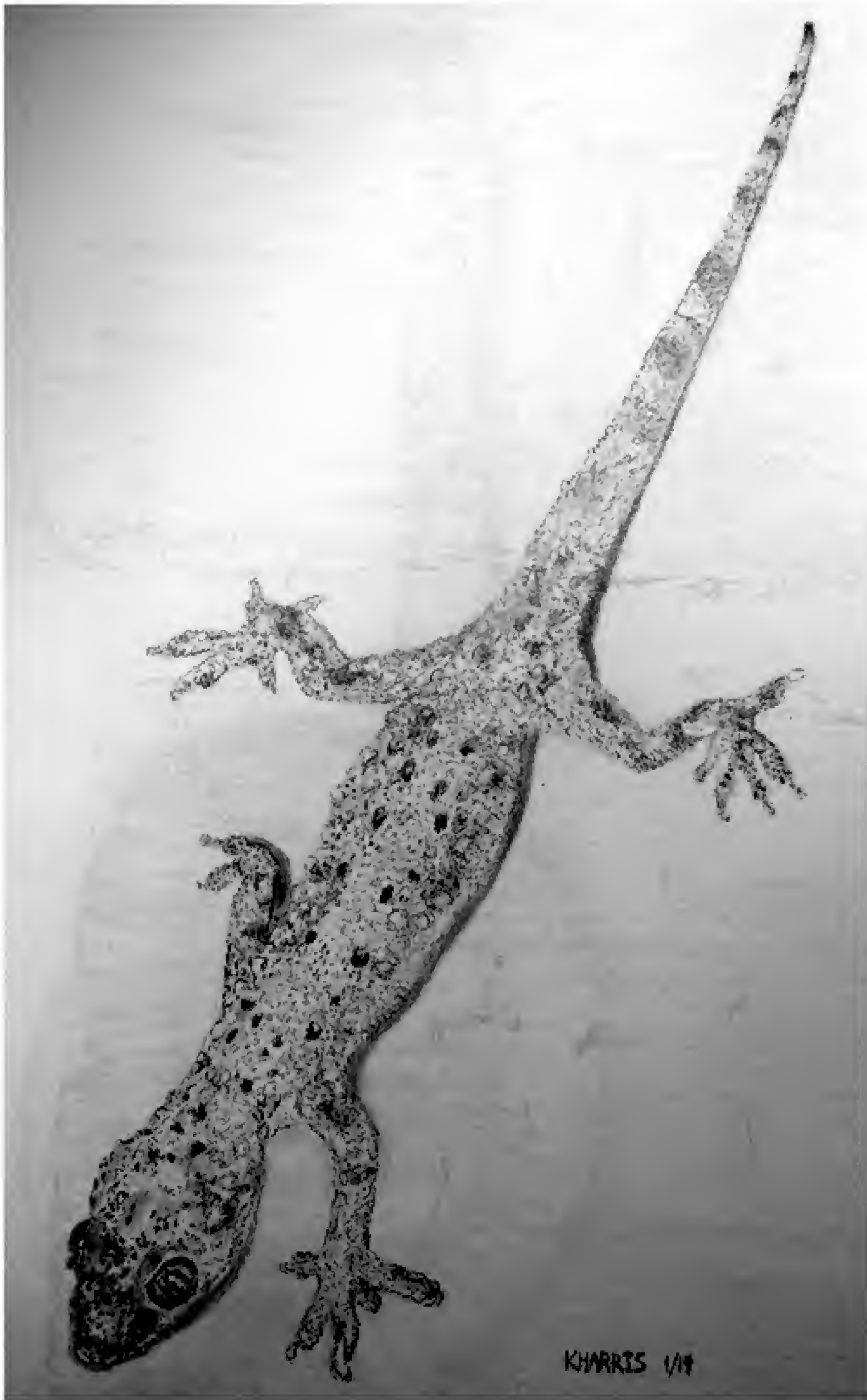
Spring 2015

No.1

Contents

Belmead BioBlitz and Ninth Annual HerpBlitz: Summary of Two Herp Surveys in Powhatan County, Virginia Jason Daniel Gibson	3
<i>Ambystoma jeffersonianum</i> at Tuscarora Pond, Douthat State Park: Data from a population at the southern extent of the species range. Paul W. Sattler and Jason D. Gibson	17
Herpetological Contributions of Donald A. Merkle. Joseph C. Mitchell	24
James A. Organ, 1931-2015. Kevin Hamed, Susan Walls and Joseph Mitchell	27
Recent Literature of Interest to Virginia Herpetology	30
Field Notes	31
President's Corner	38
Minutes of the Fall 2014 Meeting	40
Treasurer's Report	43
BioBlitz Announcement	44

Next Survey
Breaks Interstate Park 12-14 June 2015
Registration is Required
See Page 44 for details.



Belmead BioBlitz and Ninth Annual HerpBlitz: Summary of Two Herp Surveys in Powhatan County, Virginia

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Introduction

Belmead is a diverse and large property located in northern Powhatan County. Belmead, in addition to an adjoining property called St. Francis, is owned and managed by Sisters of the Blessed Sacrament. FrancisEmma Inc, is a non-profit corporation which has been established to promote and conserve the environmental and historical aspects of this property. These two properties encompass 1052 hectares of land. This land consists of pastures, agricultural land, swamps, streams, hardwood and pine forests, vernal pools, riparian bottomland forest, and several historical structures including Belmead Mansion and St. Francis School. The property is bordered to the north by the James River and to the south by State Road 684. Powhatan County is centrally located in Virginia. It lies within the Piedmont physiographic province. Some herpetological survey work was conducted in Powhatan County in the late 1990's and early 2000's (Gibson, 2001a; Gibson 2001b; Gibson and Merkle, 2004) and a one day herp bioblitz of what was to be Powhatan State Park occurred on 8 May 2010 (P. Sattler, pers. comm.).

In 2013 Sister Jean, acting on behalf of FrancisEmma and the James River Master Naturalists contacted Dave Van Gelder about the Virginia Herpetological Society participating in a BioBlitz of the property. After this initial contact Dave became the herp group contact and leader for the VHS. The bioblitz ran for a 24 hour period on May 18th and 19th. The weekend of the BioBlitz was rainy and had suboptimum weather, therefore, it was agreed that the VHS would come back for a follow up survey to try to document more species. On 21 and 22 June 2014, the VHS returned and conducted the 2014 Belmead HerpBlitz. This was the ninth annual HerpBlitz that the VHS conducted. The report that follows details the findings of the 2013 and 2014 surveys and summarizes the current status of amphibian and reptile knowledge for Powhatan County.

Study Sites

FrancisEmma inc., working in conjunction with the James River Master Naturalists, divided the Belmead and St. Francis property into 19 distinct survey sections. A map showing each lettered section can be seen in Figure 1. The VHS did not have enough people or time to survey all the property so a few areas with high potential were selected to survey.

Site A:

This site consisted of a power line right-of-way with surrounding hardwood forests on either side. In the forest there were several springs. A large agricultural field was located in the northwest edge of this site.

Site B:

Site B included the remains of St. Francis School. Surrounding this school was a home site, a tall brick furnace, grassy fields, several old crumbling buildings, and debris piles from collapsed

or pushed over buildings. An interesting feature at this site was a tunnel near the school. Adjacent to the school was a mixed pine/hardwood forest and a small perennial stream.

Site C:

This site had several old quarry ponds, a perennial stream, and a mature hardwood forest.

Site G:

Site G contained some horse pastures, horse stables, maintenance buildings, and a mixed pine/hardwood forest. Deep Creek, a large perennial stream, borders the south side of this site.

Site J:

This site consisted of a large swampy wetlands. Hardwoods surround this wetlands. At the northern edge of this site this is a riparian area that meets the James River.

Site L:

Site L included a small pond with a young mixed forest surrounding it.

Site N:

This site included a mature hardwood forest with a small perennial stream bisecting the property. Dotted along the site are several vernal pools.

Site R:

Site R consisted of the Mansion grounds. There were several debris piles and a surrounding mixed hardwood forest.



Materials and Methods

Similar data collection methods were utilized for both the 2013 and 2014 surveys with the exception that volunteers were divided into two teams for the 2014 survey. The 2013 survey had only enough people for one team. Collecting techniques included flipping over cover objects, visual observations, listening for calling anurans, hand capture, dipnetting, use of baited hoop turtle traps, and observing the roads for live and dead amphibians and reptiles. A quick visual inspection was made of all hand captured animals. Each animal was checked for malformations, injury, and disease. Group leaders were required to complete data sheets for each survey site and to digitally photograph any new county records or noteworthy observations. Tables 1 and 2 reflect the amount of survey time put into each survey site for each respective survey.

Table 1: The amount of survey effort per research site for 2013 survey.

	Site A	Site C	Site G	Site J1	Site J2	Site L
Number of surveyors	14	2	14	16	2	2
Hours surveyed	2	.1	1	1.5	.5	.1
Person hours of survey effort	28	.2	14	24	1	.2

Table 2: The amount of survey effort per research site for 2014 survey.

	Site B	Site G	Site J	Site L	Site N	Site R
Number of surveyors	13	5	12	5	11	5
Hours surveyed	2	.5	4	.5	3	1.4
Person hours of survey effort	26	2.5	48	2.5	33	7

Results

A total of 15 amphibians (nine anurans and six salamanders) and 18 reptiles (seven turtles, two lizards, and nine snakes) were observed in the 2013 and 2014 surveys. There were no county records found but one invasive species not previously recorded for Powhatan County, *Trachemys scripta elegans*, was caught in a turtle trap set in a pond at site L. Tables 3 and 4 summarize the species and number of animals found at each site for each respective survey date.

Table 3. Summary of the number of animals observed at each site for the 2013 survey.

<u>Sites</u>	A	C	G	J1	J2	L
<u>Species</u>						
Amphibians						
<i>Acris creptians</i>	1		3	13	LC	
<i>Anaxyrus americanus</i>	T					
<i>Anaxyrus fowleri</i>			2	1	8C	
<i>Hyla chrysoscelis</i>					LC	
<i>Hyla versicolor</i>			1C		LC	
<i>Lithobates catesbeianus</i>		1		LC		
<i>Lithobates clamitans</i>		1C				
<i>Lithobates palustris</i>			2			
<i>Pseudacris crucifer</i>			1C	1		
<i>Ambystoma maculatum</i>						
<i>Ambystoma opacum</i>	1			14		
<i>Desmognathus fuscus</i>						
<i>Eurycea cirrigera</i>						
<i>Notophthalmus viridescens</i>				1		
<i>Plethodon cylindraceus</i>	2					
Reptiles						
<i>Chelydra serpentina</i>		1		1		
<i>Chrysemys picta picta</i>						2
<i>Kinosternon subrubrum</i>						
<i>Pseudemys concinna concinna</i>						3
<i>Sternotherus odoratus</i>						1
<i>Terrapene carolina carolina</i>	1,1S					1D
<i>Trachemys scripta elegans</i>						
<i>Plestiodon fasciatus</i>			1	1		
<i>Sceloporus undulatus</i>						
<i>Agkistrodon contortrix mokasen</i>						
<i>Carphophis amoenus amoenus</i>	3					
<i>Coluber constrictor constrictor</i>	3					
<i>Diadophis punctatus</i>	1					
<i>Nerodia sipedon</i>		1				
<i>Opheodrys aestivus</i>						
<i>Pantherophis alleghaniensis</i>	1		SK			
<i>Storeria dekayi</i>				1		
<i>Virginia valeriae</i>						
Total Number of animals by site	13	4	10	32	8	7

D= Dead On Road, C=calling male, LC=large chorus, T=tadpoles, S=Shell, SK = shed skin, J1 = 5/18/13, J2 = 5/17/13

Belmead Survey

Table 4. Summary of the number of animals observed at each site for the 2014 survey.

<u>Sites</u>	B	G	J	L	LT	N	R
<u>Species</u>							
Amphibians							
<i>Acris creptians</i>			13	C			
<i>Anaxyrus americanus</i>	1					2	
<i>Anaxyrus fowleri</i>	2		3				1
<i>Hyla chrysoscelis</i>							1C
<i>Hyla versicolor</i>							
<i>Lithobates catesbeianus</i>			5C				
<i>Lithobates clamitans</i>		1	9	C		4	
<i>Lithobates palustris</i>		1	7	1		1	
<i>Pseudacris crucifer</i>			32			2	1
<i>Ambystoma maculatum</i>						L	
<i>Ambystoma opacum</i>	3	1					1
<i>Desmognathus fuscus</i>			1				1
<i>Eurycea cirrigera</i>			1			1,2L	
<i>Notophthalmus viridescens</i>			4			3	
<i>Plethodon cylindraceus</i>			2			1	
Reptiles							
<i>Chelydra serpentina serpentina</i>					1		
<i>Chrysemys picta picta</i>							
<i>Kinosternon subrubrum</i>				2			
<i>Pseudemys concinna concinna</i>							1
<i>Sternotherus odoratus</i>			1				
<i>Terrapene carolina carolina</i>	2S		3			1De	
<i>Trachemys scripta scripta</i>					1		
<i>Plestiodon fasciatus</i>						1	1
<i>Sceloporus undulatus</i>	1						
<i>Agkistrodon contortrix mokasen</i>	1						
<i>Carphophis amoenus amoenus</i>	1					5	2
<i>Coluber constrictor constrictor</i>	1		1			1	
<i>Diadophis punctatus</i>	1		2			3	1
<i>Nerodia sipedon</i>							
<i>Opheodrys aestivus</i>			1				
<i>Pantherophis alleghaniensis</i>	2						
<i>Storeria dekayi</i>							
<i>Virginia valeriae</i>	1						
Total Number of animals by site	14	3	85	3	2	25	10

D= Dead On Road, De = dead, C=calling male, LC=large chorus, LT = Site L turtle traps
T=tadpoles, S=Shell, SK = shed skin

Annotated Checklist

Amphibians

1. *Acris crepitans* (Eastern Cricket Frog)

Eastern Cricket Frogs were heard calling on 17 May 2013 and 31 June 2014. Cricket frogs were hand captured along the wetland at site J and in a grassy road rut at site G.

2. *Anaxyrus americanus* (American Toad)

One adult American Toad was found on top of a log at site N and one juvenile American Toad was found in grass by the school building at site B. Tadpoles were observed in a road rut at site A on 18 May 2013.

3. *Anaxyrus fowleri* (Fowler's Toad)

Fowler's Toads were found in grass by road ruts, under cover boards, under tin, and foraging on dirt roads and trails. Calling males were heard on 17 May 2013.

4. *Hyla chrysoscelis* (Cope's Gray Treefrog)

Only calling male Cope's Gray Treefrogs were found during both survey time periods. A large chorus of males were heard at site J on 17 May 2013. One calling male was heard calling from the woods at site R on 22 June 2014.

5. *Hyla versicolor* (Common Gray Treefrog)

A large chorus of *Hyla versicolor* males was heard at site J on 17 May 2013. A single calling male was recorded at site G on 18 May 2013.

6. *Lithobates catesbeianus* (American Bullfrog)

American Bullfrogs were heard calling on 18 May 2013 and 31 June 2014. Both of these observations were recorded from the wetlands at site J.

7. *Lithobates clamitans* (Green Frog)

Green frog males were heard calling on 17 May 2013 and 21 and 22 May 2014. Males were heard calling from the wetlands at site J, a pond at site L, and by a stream at site N. One adult was found in a basement of a barn at site G.

8. *Lithobates palustris* (Pickerel Frog)

Pickerel frogs were hand captured under cover boards, in a barn basement, by streams, in vegetation by a pond and in road rut water. One adult Pickerel Frog was inspected and found to have 43 chiggers on its legs.

9. *Pseudacris crucifer* (Spring Peeper)

A single calling male was recorded on 18 May 2013. Adult and metamorph spring peepers were found along the shore of a pond, on the forest floor and along the trails at sites G, J, N, and R.

10. *Ambystoma maculatum* (Spotted Salamander)

Only Spotted Salamander larvae were found at site N, during the 2014 survey. There are many vernal pools on the Belmead property so surveys in the late winter or early spring should yield many *Ambystoma maculatum* adult observations.

Belmead Survey

11. *Ambystoma opacum* (Marbled Salamander)

A total of 15 Marbled Salamanders were found during the 2013 survey. Fourteen adults were found at site J alone. Marbled Salamanders were found under logs, under railroad ties, in rotten logs, and a neonate was found in a barn basement at site G. The most unusual place where salamanders were found was in a tunnel near the St. Francis School at site B. It was unclear whether the salamanders were living and breeding in the tunnel or if they were trapped in the tunnel. See below for a photograph of a male and female marbled salamander.



12. *Desmognathus fuscus* (Northern Dusky Salamander)

Two adult Northern Dusky salamanders were found in streams at sites J and R. One was found in a stream the other was found under a rock.

13. *Eurycea cirrigera* (Two-lined Salamander)

Two larvae and two adult *Eurycea cirrigera* were found during the 2014 survey. Salamanders were found under bark, leaf litter, and a rock in a stream; one adult salamander was found 20 m from the stream on top of a log at site N.

14. *Notophthalmus viridescens* (Red-spotted Newt)

Only eft stage Red-spotted Newts were found during both surveys. Efts were observed walking on the ground, on a log, and under logs.

15. *Plethodon cylindraceus* (White-spotted Slimy Salamander)

A total of 5 slimy salamanders were found; 2 at site A, 2 at site J, and 1 at site N. These animals were found under logs and under bark/leaf litter and one adult was found 20 m from the stream on top of a log.

Reptiles

16. *Chelydra serpentina* (Snapping Turtle)

One adult *Chelydra serpentina* was observed swimming in a stream at site C, and one adult was caught in a baited hoop turtle trap at site L.

17. *Chrysemys picta picta* (Eastern Painted Turtle)

Two Eastern Painted Turtles were spotted basking on logs along the margin of the pond at site L.

18. *Kinosternon subrubrum* (Eastern Mud Turtle)

A male and a female pair of Eastern Mud Turtles were found on the shore next to the pond at site L.

19. *Pseudemys concinna concinna* (Eastern River Cooter)

Three adults were observing basking on logs in the pond at site L. One adult was found on the road near site R on 22 June 2014; presumably it was a female looking for a nesting site.

20. *Sternotherus odoratus* (Stinkpot)

The 2013 BioBlitz fish group found one Stinkpot at site L. Another observation of a Stinkpot was made in 2014. This adult was found sitting on a trail at site J.

21. *Terrapene carolina carolina* (Eastern Box Turtle)

A mixture of live and dead Eastern Box Turtles were found the two years of the surveys. On 17 May 2013 a DOR turtle was found on the road by the pond at site L. On 18 May 2013 an adult female turtle was hand captured in a grassy powerline right of way at site A and found to be eating an *Apheloria virginiensis corrugata* millipede (millipede identification was obtained from P. Marek, pers. comm). What is significant about this observation is the fact that this species of millipede is known to produce benzaldehyde and hydrogen cyanide. These two chemicals make this millipede very poisonous. See below for a photograph of this observation. Two adult shells were found in a tunnel at site B. Presumably these turtles got into the tunnel and could not get out. One adult turtle was found floating in a creek dead. The cause of death could not be determined. At site J two turtles were found walking in a dry creek bed.



22. *Trachemys scripta elegans* (Red-eared Slider)

A turtle trap, baited with canned green beans and canned sardines, yielded one adult Red-eared Slider. On visual inspection the turtle was found to have a deformed shell. The general consensus among members was that the deformity probably came from improper care before

Belmead Survey

the animal was released into the pond. Since this was an invasive species, a DGIF employee removed the animal. Despite scanning the margin of the pond with a spotting scope and binoculars in 2013 and 2014 no other Red-eared Sliders were observed.



23. *Plestiodon fasciatus* (Five-lined Skink)

Adult Five-lined Skinks were found in a log, under a cooler, in a building, and climbing a tree. One skink was found with one tick attached.

24. *Sceloporus undulatus* (Fence Lizard)

One adult Fence Lizard was observed climbing on the bricks of an old furnace at Site B.

25. *Agkistrodon contortrix mokasen* (Northern Copperhead)

A single adult Northern Copperhead was found under a debris pile at site B.

26. *Carphophis amoenus amoenus* (Eastern Wormsnake)

Eastern Wormsnakes were the most commonly found snakes with a total of 11 being found. Snakes were found under cover boards, under metal, under logs, in logs, under bark, and one was found under a paint can in a trash pile.

27. *Coluber constrictor constrictor* (Northern Black Racer)

A total of six black racers were found. Several were observed basking but the majority were found under tin and old plywood.

28. *Diadophis punctatus* (Ring-necked Snake)

Eight Ring-necked Snakes were found in the two years of surveys. All of the animals expressed the full neck band. The snakes were found under bark, under logs, under debris piles, and under tin

29. *Nerodia sipedon* (Northern Watersnake)

Surprisingly only one adult Northern Watersnake was found in two separate surveys. This adult was observed swimming in a stream at site C.

30. *Opheodrys aestivus* (Rough Greensnake)

One adult Rough Greensnake was found at site J. It was observed climbing along a downed tree.

31. *Pantherophis alleghaniensis* (Eastern Ratsnake)

Two adult and one young adult snakes were found during the two surveys. One adult was found under a log and the other two snakes were found in grassy fields.

32. *Storeria dekayi* (Northern Brownsnake)

Only one Northern Brownsnake was found during both surveys. It was found under a log in a hardwood forest by a swamp at site J. A Marbled Salamander was found under the same log as the snake.

33. *Virginia valeriae* (Smooth Earth Snake)

One adult gravid female was found under plywood at site B.

Discussion

After conducting herpetological surveys in 2013 and 2014 and adding one species not found by the VHS but documented for the property, *Lithobates sylvaticus* (J. Ryan, pers. comm.), we now can report that the combined properties of Belmead and St. Francis host a total of 16 amphibians (10 anurans and six salamanders) and 18 reptiles (seven turtles, two lizards, and nine snakes) for a grand total of 34 species. This is 64% of the estimated total number of species currently thought to live in Powhatan County (see Table 5. for a complete list of known species for Powhatan County). For people conducting future work at the property, Table 5 can be used as a species list to begin target searches to add to the total for the property.

To date there have been 53 documented species of reptiles and amphibians in Powhatan County. This includes 25 amphibians (15 anurans and 10 salamanders) and 28 species of reptiles (seven turtles, 5 lizards, and 16 snakes). Since the work done by Gibson (Gibson, 2001a; Gibson 2001b; and Gibson and Merkle, 2004) in the late 1990's and early 2000's in Powhatan County, there has been a county record confirmation and range extension in Powhatan County for *Hyla cinerea*, there has also been two new county records including the addition of *Lithobates sylvatica* (Whitehurst and Wright, 2010) and *Lithobates sphencephalus* (Powhatan State Park BioBlitz reporting forms, unpublished data) and one new invasive species, *Trachemys scripta elegans*, reported in this paper. For people working in Powhatan County in the future we suggest being on the lookout for the following species. *Pseudacris brimleyi* is the only conceivable species of anuran which could be added to Powhatan's species list. It has been observed just across the eastern border of Powhatan County in Chesterfield County. Reporting any information on the distribution or status of *Scaphiopus holbrookii*, a Tier IV conservation status species, would also be useful. In regards to salamanders, *Pseudotriton montanus montanus* has been recorded in counties to the north and south, and *Siren lacertina* has been found in Amelia County to the south (Woodward, 1998). Three turtle species which should be sought after include *Kinosternon baurii*, has been found in a connecting county to the east; *Pseudemys rubriventris*, has been documented to the north and east in joining counties; and *Clemmys guttata* which has been found in Amelia (Clifford, 2006) and Cumberland Counties (Ritchie, 2004) to the south and west. Information on *Clemmys guttata* would be a high priority due to its Tier III conservation status. Lizard species to watch out for include *Aspidoscelis sexlineata sexlineata* and *Plestidon laticeps*.

Belmead Survey

Both of these species are recorded from bordering counties. Additional notes or distribution records on *Ophisaurus attenuates longicaudus*, a Tier IV conservation species, would be welcomed. Wright (1996) published a field note and location on this species which could serve as a starting point to finding new locations or at least confirming its status in Powhatan. Snakes possible for Powhatan County include *Farancia abacura abacura*, which has been found in Amelia County, *Farancia erytrogramma erytrogramma* which is documented in the north/west portion of Chesterfield County, *Lampropeltis triangulum triangulum*, which has a wide state distribution, *Regina septemvittata* which has been documented in counties surrounding Powhatan Co., *Thamnophis sauritus sauritus* which is found in surrounding counties, and *Virginia striatula* which is found in a joining county to the east.

In addition to biogeographical data on species residing in Powhatan, more work needs to be conducted on basic natural history information on all species (Mitchell and Pague, 2014). Information on clutch sizes, behavior, diet, population sizes, rates of parasitism and disease could occupy interested people for many lifetimes. This basic information is lacking but is necessary to better understand how to preserve these species.

Table 5. Summary of all known surveys and documented species for Powhatan County, Virginia.

	M	G	P	B
Sites				
Species				
Amphibians				
<i>Acris creptians</i>	X	X	X	X
<i>Anaxyrus americanus</i>	X	X	X	X
<i>Anaxyrus fowleri</i>	X	X	X	X
<i>Gastrophryne carolinensis</i>		X	X	
<i>Hyla chrysoscelis</i>	X	X		X
<i>Hyla cinerea</i>		X		
<i>Hyla versicolor</i>	X	X		X
<i>Lithobates catesbeianus</i>	X	X	X	X
<i>Lithobates clamitans</i>	X	X	X	X
<i>Lithobates palustris</i>		X		X
<i>Lithobates sphenoccephalus</i>			X	
<i>Lithobates sylvaticus</i>			X	*
<i>Pseudacris crucifer</i>	X	X	X	X
<i>Pseudacris feriarum</i>	X	X		
<i>Scaphiopus holbrookii</i>	X			
<i>Ambystoma maculatum</i>	X	X	X	X
<i>Ambystoma opacum</i>	X	X	X	X
<i>Desmognathus fuscus</i>		X		X
<i>Eurycea cirrigera</i>		X	X	X
<i>Eurycea guttolineata</i>	X	X		X
<i>Hemidactylium scutatum</i>		X	X	
<i>Notophthalmus viridescens</i>	X	X	X	X
<i>Plethodon cinereus</i>	X	X	X	
<i>Plethodon cylindraceus</i>	X	X		X
<i>Pseudotriton ruber</i>	X			
Reptiles				
<i>Chelydra serpentina</i>	X	X		X

<i>Chrysemys picta picta</i>	X	X		X
<i>Kinosternon subrubrum</i>	X	X		X
<i>Pseudemys concinna concinna</i>	X	X		X
<i>Sternotherus odoratus</i>	X	X		X
<i>Terrapene carolina carolina</i>	X	X	X	X
<i>Trachemys scripta elegans</i>				X
<i>Ophisaurus attenuates longicaudus</i>	X			
<i>Plestiodon fasciatus</i>	X	X	X	X
<i>Plestiodon inexpectatus</i>	X	X		
<i>Scincella lateralis</i>		X		
<i>Scleoporus undulatus</i>	X	X	X	X
<i>Agkistrodon contortrix mokasen</i>	X	X		X
<i>Carphophis amoenus amoenus</i>	X	X	X	X
<i>Cemophora coccinea copei</i>	X			
<i>Coluber constrictor constrictor</i>	X	X	X	X
<i>Diadophis punctatus edwardsii</i>	X	X	X	X
<i>Heterodon platirhinos</i>	X	X	X	
<i>Lampropeltis calligaster rhombomaculata</i>	X	X		
<i>Lampropeltis getula</i>		X		
<i>Nerodia sipedon</i>	X	X		X
<i>Opheodrys aestivus</i>	X	X	X	X
<i>Pantherophis alleghaniensis</i>	X	X	X	X
<i>Pantherophis guttatus</i>	X	X		
<i>Storeria dekayi dekayi</i>		X		X
<i>Storeria occipitomaculata o.</i>	X	X		
<i>Thamnophis sirtalis sirtalis</i>	X	X		
<i>Virginia valeriae</i>	X			X

M = Mitchell and Reay, 1999, G = Gibson, 2001, P = Powhatan State Park Survey 5/8/2010 (unpublished data, acquired from Paul Sattler), B = Belmead/St Francis Survey 2013, 2014, * = recorded for Belmead but not found during this survey work.

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2013 Survey Volunteers

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Belmead Survey



2014 Survey Volunteers

Craig Abbott, Joe Banashek, Jesse Ferrell, Robert and Rosemary Frezza, Zach Gajewski, Jason Gibson, Bari Hamrick, Bryan LePere, Nathan LePere, Samy Nuchols, Craig Odell, Sandy Ogelsby, Dave Perry, Rosalind and Madison Ryan, Katherine and Gene Sattler, Paul Sattler, Mickey Silberbauer, Sarah Sterritt, Meredith Swarwout, Dave Van Gelder, Susan Watson, Amy, Cherise, John, and Jennifer White.



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***Ambystoma jeffersonianum* at Tuscarora Pond, Douthat State Park:
Data from a population at the Southern extent of the species range**

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Introduction

The Jefferson Salamander, *Ambystoma jeffersonianum*, has a range extending from Ontario, Canada and New England down into Virginia and south-central Kentucky (Petranka, 1998). In Virginia, the salamander is found along the western mountains of the Ridge and Valley Physiographic Province. Virginia is on the southern end of the species' range. The Virginia Fish and Wildlife Information Service (VaFWIS) database lists it as known from about twenty counties. In Bath County, it is reported only at Tuscarora Pond, a vernal pool in Douthat State Park; along with *Ambystoma opacum*, *Ambystoma maculatum*, *Lithobates sylvatica* and fairy shrimp, all indicator species for vernal pools (Brown and Jung, 2005). Of the three species of *Ambystoma* found at Tuscarora Pond, the Jefferson Salamander is the least common and is listed in Virginia as a Tier IV species in need of moderate conservation effort. After the 2003 VHS Survey at Douthat State Park (Gibson and Hobson, 2006), the authors took an interest in developing an ongoing study to obtain basic information for one of the species' most southern populations.

Salamanders in the genus *Ambystoma* are known as the mole salamanders because they spend most of their adult life underground. Because of this, they are infrequently observed outside of the breeding ponds. Thus, to study adult populations, most studies have limited surveys to the early spring when adults congregate (March-April in the northern ranges, earlier in southern populations). For *Ambystoma jeffersonianum*, breeding has been reported in late December and early January in southern Indiana (Downs, 1989). Populations in central Kentucky migrate into ponds in late October and November (Douglas and Monroe, 1981), and eggs have been observed as early as 3 January (Smith, 1983). In West Virginia, the initiation of breeding has been reported from early February to early March (Wilson and Friddle, 1950). Records of breeding from Virginia populations are scarce. The first was given by Jopson (1973). He reported adults at a breeding pond in Rockingham County on 24 January 1972. He later reported finding breeding pools on Shenandoah Mountain with eggs observed as early as 29 January (Jopson, 1984) and reported that Amos Showalter had found eggs deposited as early as late December or early January. He also reported that breeding had been observed as late as 9 April. Stevenson et al. (1996) reported that egg masses had been observed on 10 March 1995 and 16 February 1996 in Allegheny County. They also reported adults in breeding ponds at several locations on 23 February 1996.

Breeding typically lasts only days in the north but can last 3-11 weeks in southern populations. These consist of 2-3 major migrations sparked by rains and separated by periods of cold

weather. Males are reported to stay at ponds for 16-30 days compared to 19-21 days for females (Petranka, 1998). After breeding, adults return to their underground forest retreats, often exiting the pond in the same general direction as entering which suggests fidelity to a particular microhabitat (Douglas and Monroe, 1981). Males breed annually but females may skip one or more years between breeding events (Downs, 1989). Females have been found to be 13% longer than males with adults ranging from 65-95 mm snout to vent length (SVL)(Uzzell, 1964).

Females lay eggs within 1-2 days of mating, depositing small masses of eggs on fallen branches and other vegetative structures (Petranka, 1998). Fresh ova are 1-2.5 mm in diameter and are surrounded by jelly layers which absorb water, producing a protective layer. In central Kentucky, egg masses measure 39 x 43 mm and average 23 eggs/mass (range 2-67). In New York, egg masses measure 25 x 50 mm and average 16 eggs/mass (range 7-60). Other egg estimates include a single mass of 35 eggs from West Virginia, 22 eggs/mass (range 8-55) from southern Ohio, and 30-33 eggs/mass in another Ohio population. Females appear to lay several egg masses each as counts of ovarian eggs range from 140-280 (Uzzell, 1964), 183 and 212 from two Ohio populations (Uzzell, 1964), and 210 for four individuals from New York (Bishop, 1941).

The incubation time for eggs is inversely proportional to incubation temperature. Embryos hatch in late April – early May after 30-45 days in New York. They hatch in 28 days in an Ohio Population, and from late March to mid-April after 21-98 days in central Kentucky (summary from Petranka, 1998). Embryonic survival appears to be high. Survival rate was estimated at 87% in Ohio (Brodman, 1995), 60-88% in Massachusetts (Cook, 1983), and 71-96% in Pennsylvania.

Information on larvae is less common. Larvae grow rapidly and are voracious predators. They can be cannibalistic or consume body parts bitten from conspecifics, but the major prey are invertebrates. Metamorphosis has been reported from early July to mid-September after 2-4 months in New York (Bishop, 1941). It has occurred as early as 22 June in Indiana (Minton, 1954), and 66-80 days in Ohio (Downs, 1989). Estimates of larval survival are scarce, but indicate rates are quite low. Estimates for two years in an Ohio population are 0.08 and 0.7% (Downs, 1989) and 0% for a Maryland pond (Thompson et al., 1980). Larger larvae of *Ambystoma opacum* as well as some aquatic insects are known predators of larvae.

This summary of *Ambystoma jeffersonianum* reproduction, taken primarily from Petranka (1998), has no references to data from any Virginia populations. The significance is that Virginia is the southeastern limit of its range. Therefore, the biology of Virginia populations holds special significance and needs to be examined. Tuscarora Pond in Douthat State Park in Bath County holds one of the largest populations in the area. The only larger populations reported in the VaFWIS database are from two ponds west of Harrisonburg in Rockingham County. Populations over 100 individuals were reported in 2003, however, there do not appear to be any continuing studies at these sites. The Tuscarora population is far enough from regularly traveled routes to be safe from most forms of exploitation, and its occurrence within a state park should promote its protection and, therefore, its stability.

Materials and Methods

The site was surveyed in 2006-2009 from December until April, as time and weather permitted. Adults were captured by dip net, examined, measured (from tip of snout to posterior end of vent, weighted on an Acculab V-333 balance with readability to 0.1g), sometimes marked, and then released. In 2007 and 2008 the number of eggs per egg mass, and for a subset of masses the number of live and dead eggs, were recorded. In 2009, four gravid females were captured and placed individually in a five gallon plastic bucket with a male and small branches. On 1 April these adults were released and the number of eggs oviposited in the bucket were counted.

Results

To determine the date of first breeding in an early spring season, we made surveys as time allowed in 2006-2009. In 2006 when the fewest surveys were made, eggs were ready to hatch by mid-February, indicating that breeding occurred in either late December or early January. In 2007, the first breeding occurred after 30 December but before 13 January when 10 adults and multiple egg masses were observed. On 3 February two adults were observed swimming under the ice that covered the pond. On 24 February one adult was observed swimming under the ice. On 3 March four gravid females were captured, measured and released. In 2008 43 adults and 18 egg masses were found on 9 February. The adults were measured, marked and released. Prior to that, the pond was dry. The pond then completely dried by 23 February. There were three adult males in the pond on 8 March and one on 22 March. In 2009 the pond was dry until mid-March. There were three adult males in a few inches of water on 21 March, and eight females on 28 March with more water in the pond.

The number of eggs per egg mass, the percentage of viable eggs and average number of eggs per female is recorded in Table 1.

Table 1. Data on *Ambystoma jeffersonianum* eggs from a population in Bath County Virginia.

	AVER	STD	Range	N
# eggs/mass	39.6	16.4	7-69	26
% eggs viable	94.7		88-100	11
# eggs/♀	175	33.7	133-214	4

In 2007 and 2008 when adults were captured by dip-netting, they were weighed and measured for snout to vent length (SVL). The length and weight data for males, gravid females and nongravid females are presented below in Table 2.

Table 2. Data on *Ambystoma jeffersonianum* adults from a population in Bath County Virginia.

	SVL (mm)	STD	Wt (g)	STD	N
Males	86.1	4.3	11.0	1.6	2
Gravid Females	90.4	5.1	13.4	1.6	25
Nongravid Females	92.1	6.0	12.1	1.4	14

To determine if the size difference between sexes was statistically different, first a Kolmogorov-Smirnov test was done comparing the groups in both years to a normal distribution. The results were not significant ($P=0.18$ in 2007 and $P=0.63$ in 2008) showing that SVL in both sexes was normally distributed. Once it was known that SVL was normally distributed, a t-test was done to test for a significant difference between the sexes for both years. Females were significantly longer than males both years ($P=0.0014$ in 2007 and $P=0.0066$ in 2008)

To determine if there was a significant difference in weight between females which were gravid vs. those which appeared to have already laid their eggs, first an analysis of variance was performed on the distribution of SVL vs. weight for the gravid vs. spent females. When the distributions were found to be non-overlapping (no significant difference between the slopes of the distributions, $P=0.89$), another analysis of variance was performed between the two distributions to compare the average weight for each size. Gravid females were found to be significantly heavier than spent females ($P=0.0015$).

Discussion/Conclusions

The date of first breeding can be difficult to determine when the field site is remote and weather (snow) and work can preclude frequent visits. There were only spotty observations made during the winter and early spring of 2006, but eggs were ready to hatch by mid-February, indicating that breeding had occurred in either late December or early January. In 2007, breeding occurred between 30 December (when there were no eggs) and 13 January (when both adults and eggs were observed), probably on 5 January during a warm rain which occurred then. In 2008, 43 adults and 18 egg masses were found in Tuscarora Pond on 9 February. Prior to that time the pond was dry such that breeding was not possible. Due to drought in 2009 the first breeding was delayed until later March. On 21 March three males and eight females were found. Seven of the females appeared to be gravid, on 28 March. At Tuscarora Pond, the date of first breeding appears to occur in early January if sufficient water is present. Breeding typically occurs with the first warm rains, any time after late December. This puts *Ambystoma jeffersonianum* breeding before *A. maculatum* but after *A. opacum*. The breeding order determines the size of the larvae in the spring, which determines the predation order of these three species, giving an advantage to whichever species breeds first and is largest. The dates found here are consistent with those reported from other Virginia populations with breeding on 24 January (Jopson, 1972), 29 January (Jopson, 1984), and 16 February (Stevenson et al., 1996). Breeding appears to continue through the spring, with varying numbers of adults, until late March when the last adults are found at the breeding site. As one would expect with the direct tie amphibians have to free standing water, breeding is linked to the availability of water. Breeding occurs as water from rain and snow melt fills the pond, and needs to be completed in time for the larvae to undergo metamorphosis prior to the pond drying in the summer.

In 2007 we observed adults in Tuscarora Pond during surveys from January 13 until March 24. In 2008 we attempted to determine the length of time individual animals remained in the pond by individually marking animals by toe clipping and hoping to recapture them during subsequent surveys. On 8 February 2008 we marked and measured 43 adults. However, the pond then completely dried forcing all animals to leave the pond. Surveys in March found only four adults

in the pond, indicating the breeding season had ended for 2008.

The average number of eggs found per egg mass (39.6) is only slightly higher than those reported (16-35) for other populations (Petranka, 1998). However, because females are reported to have 140-280 ovarian eggs (Bishop, 1941; Uzzell, 1964; and Petranka, 1998) this number has questionable value since females must lay more than one egg mass. To address this question, in 2009 we placed four gravid females individually in five gallon buckets with a male. After three days the adults were released and the eggs counted. The average of 175 eggs per female is on the low side when compared to the number of ovarian eggs found, but is probably a more realistic number since not all eggs in the ovaries may mature and be laid that year. This estimate is the first report for a Virginia population. Unfortunately, we did not count the number of egg masses produced by each individual female. However, if one takes the average number of eggs per female and divides by the average number of eggs per egg mass one gets $175/39.6$ or 4.4 egg masses per female. Thus, on average females are producing 4-5 egg masses for their entire clutch of eggs.

Previous reports of embryonic survival are fairly high. Survival rates of 60-96% are reported for more northern populations (Cook, 1983; Brodman, 1995). The report of 95% here is made on egg masses which have not yet hatched, and represent the eggs which have not suffered either early developmental abnormalities or environmental problems such as freezing which would have killed the embryos. It is possible that such problems could have occurred after the counts were made in early March 2008. In fact, breeding in February of 2008 was totally negated by a drought which dried the pond and killed all the eggs laid earlier that year. The estimate of 95% is a best case situation where there is no drought.

There was no attempt to measure larval survival. We did not develop realistic methods for marking larvae until late in the study. However, both *Ambystoma maculatum* and *A. opacum* coexist in Tuscarora Pond as well as *Notophthalmus viridescens*, which would all be significant predators.

Uzzell (1964) found that females were 13% larger than males. The present study found that females were longer than males by an average of 8% in 2007 and 5% in 2008. While our numbers are not as large as previous studies, it shows the same trend, that females are significantly larger than males.

In 2007 the survey where most females were captured and measured appeared to be after a major breeding event. Many of the females did not appear to be gravid, but looked as though they had already laid their eggs. This is in contrast to 2008 when a large number of females appeared gravid, or eggs could be seen through the body wall. When the distribution between size (SVL) vs. weight for the two groups were compared, gravid females were found to be significantly heavier than spent females ($P=0.0015$). The difference in average weight was 1.52 g, which should represent the average weight of the egg mass while still in the body cavity, before it is laid and absorbs water.

These data represent some of the first basic biological information for *Ambystoma jeffersonianum* in Virginia from a population at the most southeastern extent of the species range. While the fossorial nature of the species makes it difficult to study, it is hoped that this report may generate further interest and future studies.

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Herpetological Contributions of Donald A. Merkle

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Don Merkle obtained his Ph.D. degree from Miami University of Ohio in 1975. He focused his graduate research on genetic differences among populations in two species of North American salamanders (Merkle, 1975). The results appeared in two papers published in 1977. His study of Cave Salamanders (*Eurycea lucifuga*) involved analysis of 374 individuals from 38 different localities, including two from Virginia (Merkle and Guttman, 1977). Cave Salamanders are morphologically similar across the range from southwestern Virginia west to the Missouri Ozarks (Conant and Collins, 1998). Don's analysis of 12 loci revealed little genetic differentiation across the range as well, thus corroborating the morphological data. However, he found that there were slight genetic differences in the Ozark region and south of the Ohio River. Neither population was different enough to warrant a change in the taxonomy of this species. It continues to be recognized as a full species (Crother 2012).

The other paper from his dissertation was on genetic differences among Eastern Hellbender (*Cryptobranchus alleganiensis*) populations (Merkle et al., 1977). His samples included both Eastern Hellbenders (*C. a. alleganiensis*) and Ozark Hellbenders (*C. a. bishopi*), the latter only from the Ozark region in Missouri. His analysis of 24 genetic loci in 137 specimens from 12 populations throughout the range (none from Virginia) showed genetic uniformity (Merkle et al., 1977).

Don joined the faculty at Longwood College (now University) the same year he completed his dissertation. While on the faculty, he contributed several other papers, all of which were on Virginia herpetology. A third paper published in 1977, this time as a sole author, was on the occurrence of the Eastern Spadefoot (*Scaphiopus holbrookii*) in the central Piedmont (Merkle, 1977). Don discovered that genetic variation was similar among six Virginia populations of the Eastern Cottonmouth (*Agkistrodon piscivorus*) (Merkle, 1985). These are the northernmost populations in the Coastal Plain (Mitchell, 1994). He published Field Notes in *Catesbeiana* on two occasions. His first was on several new county distribution records of the Queensnake (*Regina septemvittata*) in the Virginia Piedmont (Merkle, 1987). He later reported on male and gravid female Spring Peepers (*Pseudacris crucifer*) moving across a road in Cumberland County on 10 December 2003 (Merkle, 2004). This apparently still stands as the earliest-known migration to breeding ponds by this species in Virginia. He did not note if any males were calling, although lack of this information suggests none was calling on that date.

Don was a co-author on two publications with his Master's student Jason Gibson. They published a paper on road mortality of snakes in Powhatan County (Gibson and Merkle, 2004). They documented 14 species killed on roads during 1999-2001. May/June and September/October were

the periods in which most of the snakes were active. They also published a note on reproduction by Spotted Salamanders (*Ambystoma maculatum*) in seven breeding ponds and vernal pools in Powhatan County (Gibson and Merkle, 2005). They described arrival of the first female, departure of the last female, first appearance of spermatophores and egg masses, egg survival, placement depth, and attachment substrates for the 1999 reproductive season.

Don's other professional contribution was editor of the first three issues of *Catesbeiana* in the first two volumes (1981-1982) following the change in the VHS publication format from an occasional bulletin to a formal journal in 1979. He hosted VHS meetings at Longwood College in 1979, 1981, and 2006. He attended several national meetings. He is pictured along with Joe Mitchell talking to Roger Conant in an obituary photo at the 25th anniversary of the Society for the Study of Amphibians and Reptiles in Raleigh, NC in 1982 (Mitchell, 2004, p. 31). Don published only a handful of publications on herpetology during his time in Virginia. These publications and his contributions in other ways to herpetology in general and Virginia in particular made him an important figure in the history of this field of science.

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L to R: Chris Pague, Richard Hoffman, Bob Bader, Wendy Robertson holding Joshua Mitchell, Charlie Hooper, Joe Mitchell, unknown, Don Merkle.

Photo taken at the 1981 VHS Meeting Hosted by Don at Longwood College.

James A. Organ (1931-2015)

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James (Jim) Albert Organ spent a lifetime researching plethodontid salamanders, especially within the Mount Rogers National Recreation Area (MRNRA) in southwestern Virginia. He contributed greatly to Virginia herpetology and was a lifetime member of the Virginia Herpetological Society. Jim's research is considered a benchmark for other plethodontid salamander courtship and life history work. However, a long-lasting memory of Jim Organ will be his role as an ambassador for plethodontid salamanders in the MRNRA.

Jim Organ was born on 29 March 1931 in Newark, New Jersey and was introduced to science, especially salamanders, as a participant in the junior museum program at the Newark Museum. Following high school, Jim enlisted in the U.S. Air Force and earned the rank of staff sergeant. After serving his country, Jim earned an A.B. degree from the Newark College of Arts and Sciences at Rutgers University, graduating with high honors in the natural history curriculum and special honors in biology. At Rutgers, Jim met Della Sprague, a fellow biology major, in an embryology course. Jim and Della were married in 1956 and the couple enjoyed 57 years of marriage until Della's death in 2013. Della was a faithful confidant and always accompanied Jim during his field collections and for most of his laboratory courtship trials. In 1956, the couple also moved to Ann Arbor, Michigan for Jim to begin graduate school and for Della to obtain a B.S. in Zoology. They had two daughters Linda Joyce, born in 1960, and Sylvia Fawn, in 1963.

Jim obtained an M.S. (1958) and Ph.D. (1960) from the University of Michigan while under the direction of Charles M. Walker. Jim chose Whitetop Mountain and Mount Rogers for his study sites after falling in love with southwest Virginia during a field trip throughout the Southern Appalachian Mountains following Emmitt Reid Dunn's trail. Jim's master's thesis was on the courtship and reproduction of *Plethodon jordani* (now *montanus*) and *P. glutinosus* (now *cylindraceous*), as well as the life history of *P. welleri* (Organ 1958, 1960a, 1960b). For his dissertation, Jim wanted to expand upon the work of Nelson Hairston (1949) in North Carolina where he documented elevational gradients of plethodontid salamanders. Jim established

elevational transects and recorded salamander distributions at 100' intervals on both northern and southern slopes of Whitetop and Bluff Mountains as well as Mount Rogers. Jim's dissertation research created the foundation for a long term study to examine elevational distributions in what would later become the MRNRA. It was the first substantial salamander work in the Whitetop Mountain region of Virginia. Jim's research also included life histories, population ecology, and reproduction of five species of desmognathine salamanders (Organ 1961a). During his research, he collected over 12,000 salamanders, 7,000 of which were *Desmognathus*, and all are in the University of Michigan, Museum of Zoology collection. As a portion of his dissertation, Jim also documented the courtship and life history of *Gyrinophilus porphyriticus* and *Desmognathus wright* (now *organi*) from the MRNRA (Organ 1961b, 1961c). From his work at Mount Lake Biological Station, Jim recorded the courtship of *Eurycea lucifuga* and *Pseudotriton ruber* (Organ 1968, Organ and Organ 1968).

Jim continued to work within the MRNRA and focused his attention on long term studies of salamander distributions throughout his career. From 1990 to 1991, the U.S. Forest Service contracted with Jim and Della to repeat his dissertation surveys and to include additional areas within the MRNRA (Organ 1990, 1991). Based on his recommendations, the U.S. Forest Service created a salamander management zone that protected most areas above 4,000 feet within the MRNRA. Jim also recommended the elimination of commercial collection of salamanders for fishing bait, and the carefully examined collection requests to MRNRA staff to ensure they had scientific merit. *Desmognathus organi* (formerly *D. wright*; Northern Pygmy Salamander) was named after Jim Organ for lifetime of salamander conservation (Crespi et al. 2010).

For 31 years (1961-1992) Jim was a faculty member at The City College of the City University of New York, serving as the department chair and executive of the Ph.D. program. During summer breaks, Jim and Della would return to southwestern Virginia to conduct field work. They built a cabin at the base of Mount Rogers in Konnarock, VA and made it their permanent residence in 1999 after Jim's retirement in 1995. Even during retirement, Jim and Della continued their passion for salamanders as they led interpretive hikes and gave programs on plethodontid salamanders, including the keynote speech for the 1996 Mount Rogers Naturalist Rally. Many researchers working in the MRNRA benefited from Jim's guidance, and he provided advice and insight for modern resurveys of his historical datasets. Jim and Della were also great salamander ambassadors to the local community surrounding the MRNRA. Fears of endangered species and land seizures were often calmed with Jim's knowledgeable conversations. Local residents knew Jim and Della and they were well respected. Some local residents even coined the nickname the "salamaster" for Jim.

Jim Organ died on January 16, 2015 in Konnarock, Virginia. His impact on plethodontid salamanders, especially in the Mount Rogers National Recreation Area, will be long remembered and serve as a testament to a lifetime of hard work.

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Jim and Dell Organ celebrate their 50th wedding anniversary in 2006 at the Konnarock, VA community center.

Recent Literature of interest to Virginia Herpetology:

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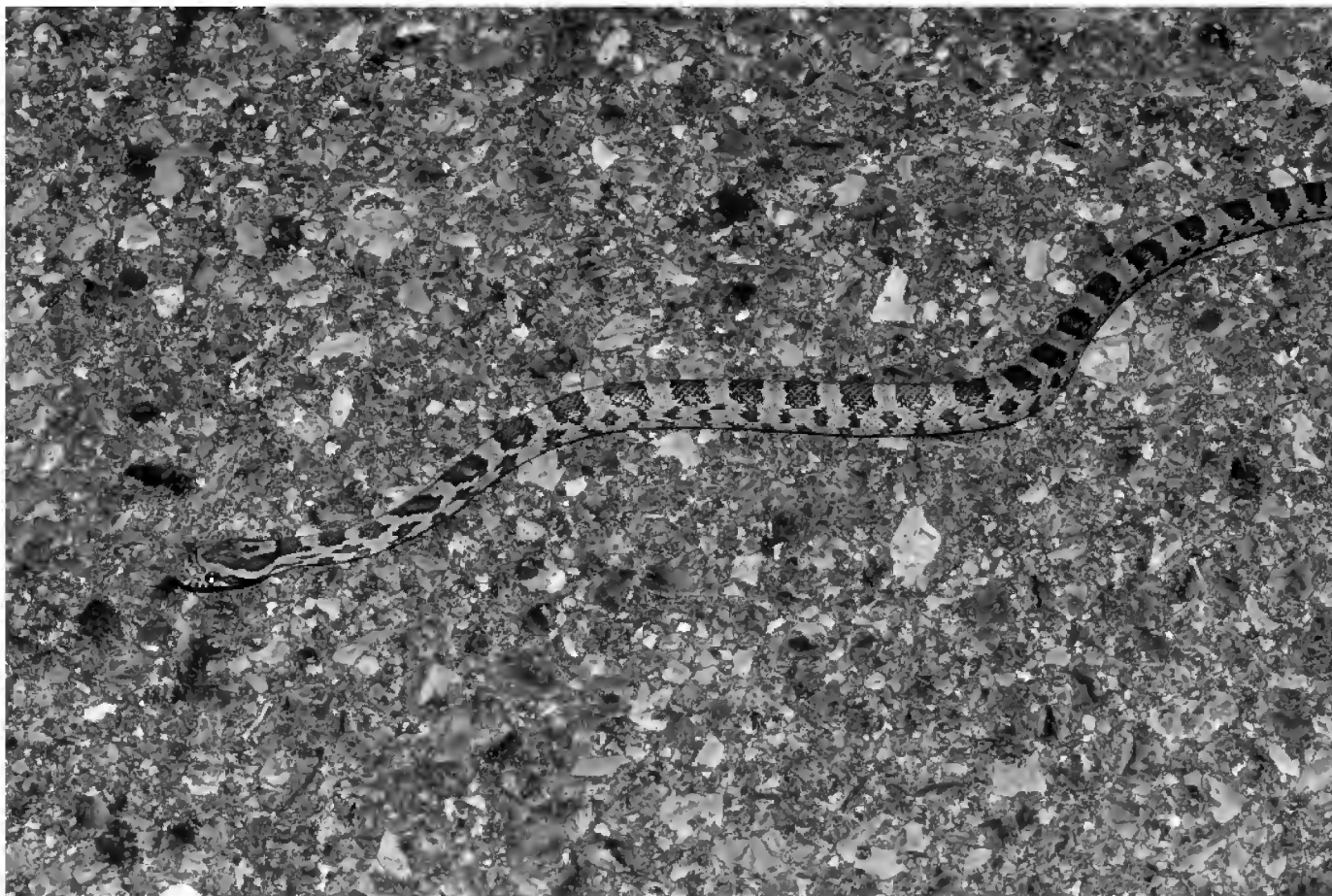
Field Notes

Pantherophis guttatus (Red Cornsnake): VA, Craig Co., Route 615, 400m south of Botetourt/Craig County line, (37.58785N -80.00622W). 26 June 2014. Lance H. Benedict

County Record: The Red Cornsnake was first reported west of the Blue Ridge in the James River drainage at least as early as 1910 (W.D. Appell, NMNH specimen 55416). Hoffman (R.L. 1986. The Herpetofauna of Alleghany County, Virginia, Part 3. Class Reptilia. Catesbeiana 6(1):4-10.) reported them as not uncommon in the vicinity of Clifton Forge. Since then specimens have also been reported from Botetourt County and Roanoke County in the James River drainage.

On a May 2014 trip to Botetourt and Craig counties several Red Cornsnakes were encountered in Botetourt County within 5 km of the Craig County line. On a return trip on 26 June 2014, a 2013-cohort Red Cornsnake was observed crossing Route 615 approximately 400m into Craig County at 2115 h EST. The Red Cornsnake has not been previously documented for Craig County by Mitchell and Reay (1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries. Richmond, VA 122pp.) or the Virginia Herpetological Society (<http://www.virginiaherpetologicalsociety.com/cgi-bin/herplist/action.php>). A digital photograph of the specimen was submitted to the VHS archives (Archive#319).

Lance H. Benedict
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***Storeria dekayi dekayi* (Northern Brownsnake):** VA, Orange Co., Didymus Farm (38°18'53.52"N 77°48'51.64"W) 2 April 2015. Ben Thomas.

County Record: On 2 April 2015 I observed a snake on our farm. Per usual, a digital photo was sent to the VHS for identification in order to prevent harm to non-venomous snakes. The snake was identified by the VHS as a Northern Brownsnake. This species had not previously been reported from Orange County in Mitchell and Reay (1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries. Richmond, VA 122pp.) or the VA Department of Game and Inland Fisheries FWIS Database. A digital photograph was deposited in the VHS Archive (Archive #320) as a voucher.

Ben Thomas
Didymus Farm
Locust Grove, VA 22508



***Sceloporus undulatus* (Eastern Fence Lizard)** VA: Orange Co., 15050 Shirley Road. 2 May 2015. Edward Roche, Maureen Roche.

County record: Our one-year-old male cat was observed carrying a lizard from a large, man-made rock pile in a wooded area of our property. I demanded the cat release the lizard, then retrieved the lizard and noted blue markings on both sides of his belly. I would estimate his length as six inches from nose to tail tip. I photographed the lizard and released him into a nearby wooded area.

After consulting the Virginia Herpetological Society website, I contacted Kory Steele, who was able to confirm the lizard as a male Eastern Fence Lizard from my photograph and description,

and informed me this was a new county record. A photographic voucher was deposited in the VHS Archives (#333).

Maureen Roche, M.A.
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***Terrapene carolina carolina* (Eastern Box Turtle)** VA: City of Richmond, 37.535089N, 77.526953W, 24 June 2014, Stephanie Foertmeyer.

Maximum egg size: Box turtle egg sizes vary among subspecies, populations, and individuals (Ernst and Lovich. 2009. *Turtles of the United States and Canada*. Johns Hopkins University Press, Baltimore, MD). Ernst and Lovich (*op. cit.*) listed a maximum length of 40.4 mm and maximum width of 25.1 mm for *Terrapene carolina* but did not note the location or subspecies. Maximum size ranges from 40.2 x 25.1 mm in Louisiana (Dundee and Rossman. 1989. *The Amphibians and Reptiles of Louisiana*. Louisiana State Univ. Press, Baton Rouge, LA), 35 x 19 mm in Illinois (Cahn. 1937. *The Turtles of Illinois*. Univ. of Illinois, Urbana, IL), 34 x 20 mm in Arkansas (Trauth et al. 2004. *The Amphibians and Reptiles of Arkansas*. Univ. Arkansas Press, Fayetteville, AR), 32 x 19 mm in West Virginia (Green and Pauley. 1987. *Amphibians and Reptiles in West Virginia*. Univ. Pittsburgh Press, Pittsburgh, PA), and 37.9 x 22.2 mm in North Carolina (Palmer and Braswell. 1995. *Reptiles of North Carolina*. University of North Carolina Press, Chapel Hill, NC). The maximum egg size known for Virginia was 40.1 x 23.4 mm; the weight was 13.0 g (Mitchell. 1994, *The Reptiles of Virginia*. Smithsonian Institution Press, Washington, D.C.).

We report here a new maximum egg size for *T. c. carolina* from a Virginia population. The female was in a captive population that had been rescued from a development site in Richmond, VA and maintained for 12 years in a managed natural environment. She reached maturity in 2006 and is now estimated to be 16-18 years of age. This female has produced 1-2 clutches annually

since then. One of three eggs laid in her second clutch on 24 June 2014 was larger than the largest previously recorded in Virginia (Mitchell. 1994. *op. cit.*). The egg measured on 25 June 2014 was 42.2 x 24.2 mm and weighed 14.5 g (Figure 1). The other eggs in the clutch and measured on the same day were 40.5 x 24.8, 14.6 g and 35.06 x 22.16, 10.02 g, both well within previously published ranges (Mitchell. 1994. *op. cit.*). The length of the largest egg was 2.1 mm larger and 1.5 g heavier than the previous maximum size known for Virginia (Mitchell. 1994. *op. cit.*). Egg measurements taken within a day of oviposition when and wherever possible would continue to add important information to knowledge of variation in the life histories of Virginia turtles.

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Figure 1. The largest egg known from a Woodland Box Turtle (*Terrapene carolina carolina*) in Virginia. One of the other normal-sized eggs in the clutch is included for comparison.



***Terrapene carolina carolina* (Woodland Box Turtle)** VA: City of Richmond, 37.535089N, 77.526953W, 29 September 2014. Stephanie Foertmeyer.

Maximum size: Reports of maximum size records are based on turtles from natural populations and those in captivity. Captives maintained in artificial environments and fed frequently may attain sizes larger than recorded for natural populations. However, these turtles provide information on sizes potentially reached by the species in nature. Maximum body size (straight-line carapace length [SCL]) in box turtles exhibits considerable sexual size dimorphism. Ernst and Lovich (2009. *Turtles of the United States and Canada*. Johns Hopkins University Press, Baltimore, MD) reported a maximum SCL of 235 mm for male *Terrapene carolina* and 198 mm for females. The male was a Gulf Coast

Box Turtle (*T. c. major*) which occurs in the lower Coastal Plain from Louisiana to northern Florida and the female was a Woodland Box Turtle (*T. c. carolina*) from New York (Cook et al. 1972. International Turtle & Tortoise Society Journal 6:8-17). This is an exceptionally large female because there are few records of this sex for *T. c. carolina* larger than 165 mm SCL (Dodd, 2001. North American Box Turtles, A Natural History. University of Oklahoma Press, Norman, OK). Maximum carapace length also exhibits geographic variation. *Terrepene c. carolina* maximum SCL ranges from 174 mm for males in Connecticut and 198 mm for females in New York, respectfully (Cook et al. op. cit.; Klemens. 1993. Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin No. 112, Hartford, CT) to 152 mm (males) and 149 mm (females) in North Carolina (Palmer and Braswell. 1995. Reptiles of North Carolina. University of North Carolina Press, Chapel Hill, NC). In Virginia, males reach 155.9 mm SCL and females reach 151.5 mm SCL (Mitchell. 1994, The Reptiles of Virginia. Smithsonian Institution Press, Washington, D.C.). We report here a new maximum size male *T. c. carolina* from a Virginia population. The largest male in a captive population rescued from a development site in Richmond, VA and maintained for 11 years in a natural captive environment reached a SCL of 158.2 mm, 2.3 mm larger than previously known. His body mass (658 g) exceeded the formerly known maximum mass of 603 g (Mitchell op. cit.) by 55 g. The maximum known SCL for females (151.5 mm, Mitchell op. cit.) remains unchallenged.

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Figure 1. Largest known Woodland Box Turtle (*Terrapene carolina carolina*) in Virginia.



Northern Water Snake (*Nerodia s. sipedon*) MD: Anne Arundel Co. Smithsonian Environmental Research Center (38°53'24.81"N 76°33'27.04"W). 21 September 2014. Todd A. Tupper, Robert Aguilar, Alyssa Ferrara and Coline Hay.

Snake Fungal Disease: Snake fungal disease (largely due to a potentially pathogenic fungus, *Ophidiomyces ophiodiicola*) is an emerging infectious disease that has been identified in wild populations of colubrid and viperid species (*Nerodia sipedon*, *Coluber constrictor*, *Pantherophis obsoletus*, *Lampropeltis triangulum*, *Farancia abacura*, *Agkistrodon contortrix*, *Crotalus horridus*, *Sistrurus catenatus* and *Sistrurus miliarius*) and in fifteen states: New Jersey, Georgia and Virginia, Connecticut, Massachusetts, Minnesota, New Hampshire, New York, Ohio and Wisconsin, Illinois, Florida, Michigan, South Carolina and Tennessee (Anonymous. 2013. First case of snake fungal disease verified in South Carolina. South Carolina Department of Natural Resources press release. 11 October 2013; Sleeman. 2013. Snake fungal disease in the United States. United States Geological Survey National Wildlife Health Center Wildlife Health Bulletin 2013-02; Tetzlaff et al. 2014. Presence of snake fungal disease in a northern population of the Eastern Massasauga [*Sistrurus catenatus*]. Biology of the pit vipers conference presentation abstract. Tulsa, OK, 7 June 2014; Yates 2014. Scientists gear up to fight deadly snake fungal disease. Illinois News Bureau release, 15 July 2014). Though the population-level effects of snake fungal disease are unknown (Sleeman. 2013. Snake fungal disease in the United States. United States Geological Survey National Wildlife Health Center Wildlife Health Bulletin 2013-02), it has caused mortality in some individuals and is associated with population declines of New Hampshire *C. horridus*. It is thought that this disease, coupled with other environmental stressors, can act synergistically resulting in snake extirpations (Clark et al. 2010. Decline of an isolated timber rattlesnake (*Crotalus horridus*) population: Interactions between climate change, disease, and loss of genetic diversity. Biological Conservation 144:886-891).

On 21 September 2014 at approximately 14:30 (24°C) we encountered four *N. s. sipedon* adjacent to a known hibernaculum at Smithsonian Environmental Research Center (SERC) in Edgewater, Maryland. Two snakes were basking above ground in black cherry (*Prunus serotina*), one was basking on a fence and the fourth snake was moving sluggishly in a shallow, slow moving stream. Three of the four snakes showed clinical signs of snake fungal disease (see Sleeman. 2013. Snake fungal disease in the United States. United States Geological Survey National Wildlife Health Center Wildlife Health Bulletin 2013-02). The two individuals basking in *P. serotina* had symptoms confined to the head. One individual had major swelling and hyperkeratosis of the supralabials, and less severe hyperkeratosis of the infralabials and gulars. The other had hyperkeratosis of the upper infralabials, rostral, internasals and prefrontals. The body (both dorsum and venter) of the basking individuals appeared lesion free. The individual located in water appeared to be severely affected. We noted hyperkeratosis of the anterior infra and supra labials, and the rostral and mental. A deep tissue nodule was present at the parietal-body scale junction. A white opaque cloudiness of both eyes (not associated with molting) was also noted; however it was more pronounced on the snake's right side, giving the iris and pupil a sunken-in appearance. Additionally, abnormal swelling, hyperkeratosis and degeneration of ventral scutes and dorsal/dorsolateral scales occurred from neck to tail. The distal third of this snake's tail was lost, and hyperkeratosis was apparent on the tail tip. The latter individual (and others captured during time-constrained searches conducted at SERC in 2014) was swabbed. Swabs will be used to identify (via quantitative polymerase chain reaction) the mycotic species present in both symptomatic and asymptomatic individuals.

Although this is not our first observation of snake fungal disease at SERC (hyperkeratosis of supralabials in *C. constrictor* on 14 June 2014), to the best of our knowledge this represents the first

Field Notes

documented case of snake fungal disease in Maryland and recommend that a heightened biosecurity protocol be employed when conducting fieldwork at SERC. This note concerns observations of snake fungal disease in Maryland. However, SERC is only approximately 43 km from the western shore of the Potomac River in Virginia. This region includes natural areas where squamates take refuge from surrounding urbanization and include areas to the south such as Accotinck Bay, Pohick Bay, Mason Neck National Wildlife Refuge and State Park, Huntley Meadows Park and Quantico Marine Base. Therefore, to reduce transmission of this disease, we recommend that VHS members and associated snake enthusiasts photo document symptomatic snakes, and implement biosecurity measures when handling snakes and traveling between and within sites in Virginia and Maryland.

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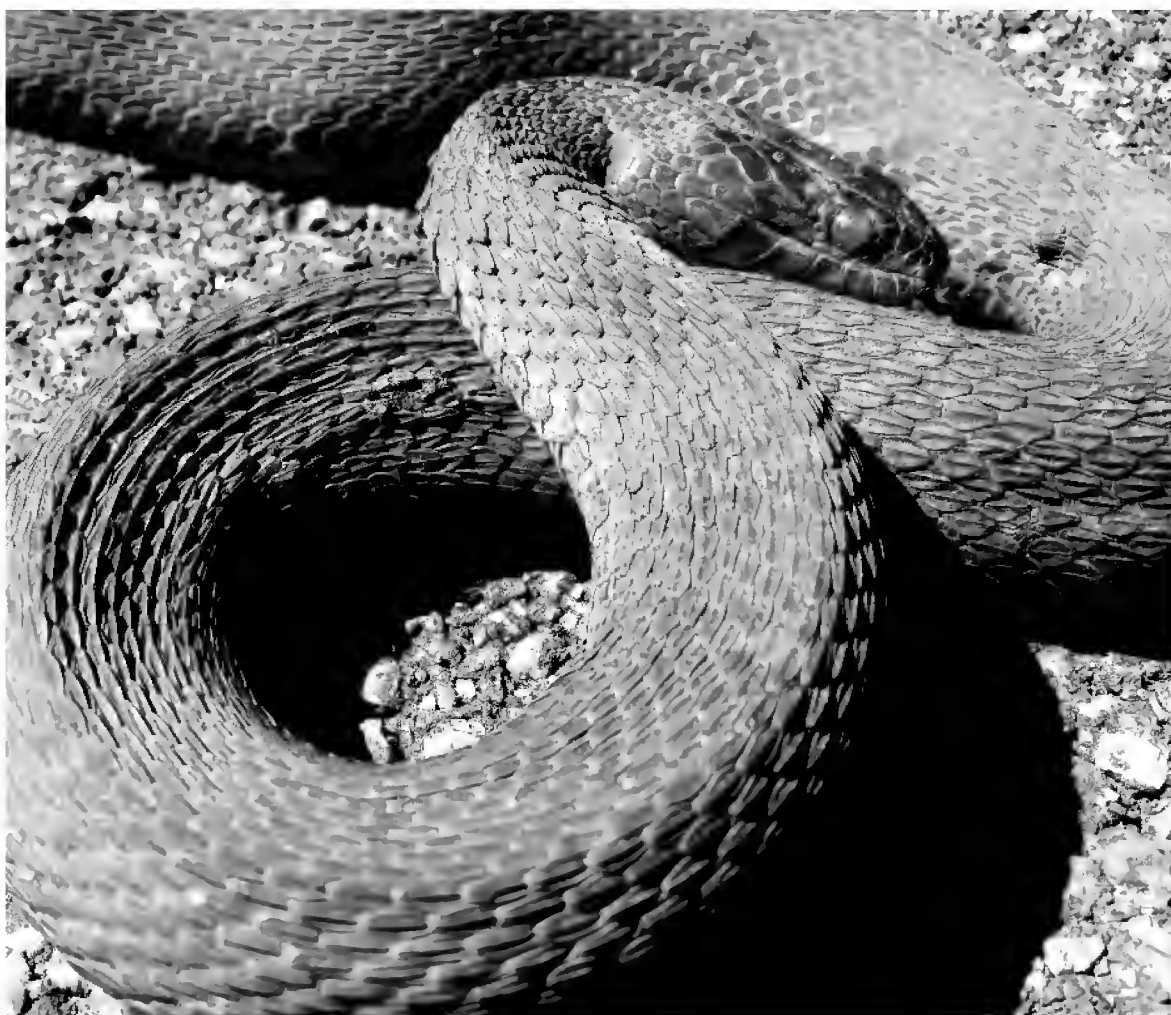
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President's Corner

Child abuse and animal abuse are very similar, both involving the physical or mental abuse of beings that are generally unable to defend themselves. Those that conduct the abuse are guilty of some of the most depraved acts humans have been able to conjure. They do it either shamefully or in a blatant disregard of ethics and laws. They may even know what they are doing is wrong, but they do it anyway.

Unfortunately, the herpetological community has encountered numerous instances over the last few years of people, sometimes high profile, boasting about their killing and torture of reptiles. Thanks to social media, these people are making the mistake of posting pictures of themselves killing animals. The most recent instance that prompted this letter is of a woman in our home state that found a snake (likely a mole kingsnake), posted pictures of the snake being held with a stick and set on fire while still alive. Other instances include Blake Shelton, of country music and The Voice fame, joking on Twitter about aiming for a box turtle on the road. Then when his followers called him out on it, he reacted in a juvenile way that does not fit his TV persona at all. Then we have Patrick Willis, the professional football player that shot and killed a gopher snake outside his home. Despite being in a profession that is the epitome of masculinity, Willis was so afraid of the snake that his photo on Facebook shows him holding the dead snake out at arm's length on the end of a stick. Two girls in Florida filmed themselves setting fire to a gopher tortoise and then stomping it to death. In 2012 a pastor in Franklin County, Virginia, was hailed for his heroism in a local newspaper for going to a park in town and shooting and killing the (Northern) watersnakes that were out basking. It is illegal to kill any animal in Virginia that does not have a hunting /fishing permit associated with it (Virginia code § 29.1-521).

This baffles me. Much like child abusers and serial killers, they lacked the basic core human function of empathy towards others. At some point they decided it was okay for them to torture an animal. The feeling of fear and pain is not unique to humans, so our compassion towards stopping fear and pain should not stop with humans. Any of you reading this will likely have an understanding of the suffering of any being, child and turtle alike, but it is sad we have to teach this to others. Human empathy seems to be limited to those immediately around us. Our society has decided that someone shooting a feral cat is a criminal act, but stomping on the head of a snake that is actually harmless to humans, is perfectly okay.

I have spoken of the need for public education in the President's Corner before, and clearly we have a lot of work to do. Ignorance is the excuse used for the fear and outright hatred of our beloved herps, especially snakes. As much as I like frogs and turtles, nearly all of my public education efforts go towards teaching people about snakes. It is worth it, since people still believe the wives tales born out of ignorance 200 years ago. In this day with the world's collective knowledge available within a 0.0002 second internet search, and plenty of zoos, aquariums, museums and nature centers near many towns, we should no longer be apologetic about ignorance that results in the needless killing of harmless animals. These behaviors should not be tolerated in a civilized society, and luckily social media has provided a method of feedback to the people and show them their bragging is not accepted.

Recently I taught a cohort for the Virginia Master Naturalists on Reptiles. I saved snakes for last and when I got to that section I first displayed several photos of young girls holding snakes. Some were proud, and some were smiling. I stated that some of you have a fear or hatred of snakes, but I don't care. I left a pause. I continued with a stoic expression and saying they were all there to learn about "nature" and with 30 species of snakes native to Virginia alone, clearly they serve an

President's Corner

important role in “nature”. Their presence is inescapable. Continuing to ignore them and to hold onto an irrational fear of them is juvenile. Turning to the display and proud / smiling girls, I said if these “little girls” could hold a snake with a smile on their face then what is your excuse for being a sissy? This received a supporting “Amen!” from a few herp savvy attendees.

Was that harsh? I hope it was. When we have people driving over one hundred year old turtles and torturing snakes with a method outlawed for humans 190 years ago, I’m not sure why this is not the time to call people out, to their face, about their self-imposed absurdity.

Our website has a wide breadth of information freely available that is unrivaled by any other state herpetological society. Our species pages are well known for providing ID information and comparison photos. Under our Departments tab, you will find information and free presentations for various age groups. All of these can be instruments for public education. If you do not find something that you need, write us. If there is something we have that you can use, it will be yours to use. We are all tasked with being stewards of the environment and to be a spokesman for those that can’t speak for themselves. Save a snake. Speak up!

Kory Steele
VHS President



Virginia Herpetological Society
Fall Annual Business Meeting-Three Lakes Nature Center
Minutes of Meeting

Kory Steele, President of the Virginia Herpetological Society (VHS), opened the meeting shortly after 14:45 hr. and provided the agenda for the meeting.

Old Business

There were no remaining old business items to discuss.

Committee Reports

Newsletter Report

Susan Watson, Co-Editor, presented the Newsletter Report, as the Co-Editor, Joellen Welch, was unable to attend the meeting. Susan reported that the addition of Joellen as Co-Editor had substantially eased the publication effort and many favorable comments had been received about the new format.

Catesbeiana

Paul Sattler, Editor of Catesbeiana, reported that three surveys had been edited and he expected that the next issue of Catesbeiana would be sent out in late October/early November. Paul also reported that a half dozen survey reports had not yet been completed, including the two Canebrake Rattlesnake surveys of Cavalier WMA. Kory Steele pointed out that there was no plan to publish the Canebrake surveys as this program was intended only to support the VDGIF Canebrake tracking efforts. Survey summaries for James River State Park and Belmead Plantation had not yet been completed.

Education

Mike Clifford, Education Committee Chairperson, could not attend the meeting but did provide a written report, which was distributed at the meeting.

Herpblitz

Jason Gibson, HerpBlitz Chairperson, reported that Natural Bridge State Park was a possible candidate for the 2015 HerpBlitz survey. Jason will also be looking at possible survey site candidates in southwestern Virginia.

Café Press

Patricia Crane, Café Press Chairperson, reported that since October 2013, 67 orders for 107 items had been received. The Q3 Café Press commission for approximately \$27-28 was pending.

Treasurer/Secretary

David Perry, VHS Treasurer/Secretary reported that VHS had a September 30 bank account balance of \$11,163.87. There was some discussion about how to deploy some of the funds, including options such as a long term savings account for a better interest rate, additional donations and equipment purchases (sanitation materials, turtle traps, audiovisual equipment etc.). No decisions were made.

Minutes

In 2014 VHS had 249 members (42 are lifetime members). However, 85 of the 2013 annual members did not renew their membership for 2014 and membership retention remains an issue. VHS currently has 2,974 Facebook Fans.

David Perry agreed to send a void check to Mike Salotti to open an Amazon Smile account.

VHS Website

John White, VHS Webmaster, reported that he continues to receive many compliments about the new website format and content. Kory Steele suggested an “attention grabbing” web page comparison of venomous vs. non-venomous snakes might accelerate VHS education/conservation efforts regarding snakes.

Research

Michael Meyers, Research Committee chairman, could not attend and a Research Report was not received by the start of the meeting.

Advisory Committee

None of the Advisory Committee members were able to attend the meeting and there were no updates to report.

New Business

Kory Steele introduced several new business topics.

Donation to Belmead Plantation

VHS has conducted two recent surveys of Belmead Plantation. David Van Geleder organized VHS participation in a May 2013 BioBlitz and Jason Gibosn led the June 2014 HerpBlitz at Belmead. Several VHS members have previously recommended a donation by VHS to Belmead Plantation to help finance conservation efforts there. Kory Steele reported that he had contacted Sister Jean Ryan, coordinator for the Belmead conservation effort, to discuss ways in which VHS might make a contribution which could also support the VHS mission. Sister Jean did not provide a specific recommendation. There was discussion about the possibility of VHS providing Belmead with turtle crossing signs for the main roadway or herp-related trail head signs. Several VHS members expressed support for a general conservation donation. No decision was made but Kory Steele agreed to contact Sister Jean Ryan again to explore donation options.

Changes to, increasing, newsletter editions

Kory Steele proposed that the Newsletter be scaled-down in size but published more frequently (3-4 issues/yr). This proposal will be implemented and might help improve the perceived value of VHS membership.

Members not getting emails from news@vaherpsociety.com

Kory has received feedback from a few VHS members, including Mark Khosravi, that they have not been receiving emails from some of the mass VHS email submissions. The source or cause of this problem is not known but all Business Meeting participants should on the lookout for potential problems and report any incidents.

Discuss potential survey sites for 2014

Lake Anna State Park was previously considered for the 2014 Spring Survey but an agreement with park personnel could not be achieved. Lauri Schular is a DCR employee and 2014 VHS member, who previously sponsored a successful VHS survey at Smith Mountain Lake. Lauri has a new assignment (Chief Ranger Visitor

Experience) at Lake Anna State Park and has indicated she would enthusiastically promote and support the 2015 Spring Survey, if Lake Anna is selected. Some VHS members indicated that in their past visits to Lake Anna, they found the habitat and herp species diversity disappointing. Travis Anthony will investigate Lake Anna for herp potential to help with the Spring Survey site decision.

Atlantic Coastal Pipeline project & Cow Knob Salamander

There was some discussion about the possibility of VHS taking a public position in opposition to the Atlantic Coast Pipeline project. Jason Gibson recommended against a public VHS position and his recommendation was accepted without dissent.

Open Discussion

Several ideas were floated for improving membership retention including additional surveys and other events, a PayPal subscription service, regional VHS chapters etc. John White agreed to investigate the possibility of a subscription service via PayPal.

There was some concern expressed that additional surveys or greater membership participation in surveys might cause more harm than good through habitat destruction and/or the spread of viral infections. This topic will be re-visited once the impact of VHS sanitation guidelines are more clearly understood.

With no further business to discuss, the business meeting was adjourned.

David A. Perry
VHS Treasurer/Secretary



**Virginia Herpetological Society
Treasurer's Report
May 17, 2015**

Previous Report Balance – October 18, 2014 \$11,362.24

Net Receipts (excludes PayPal fees):

November Dues	\$86.22
Café Press Commission	\$32.50
December Dues	\$548.24
January Dues	\$785.97
Donations	\$146.10
Café Press Commission	\$29.66
February Dues	\$492.33
March Dues	\$534.45
April Dues	\$277.18
May Dues (thru May 17)	\$125.39
Amazon Smile Credit	\$6.71

Total Net Receipts \$3,064.75

Disbursements:

Catesbeiana Postage	\$26.64
2015 SCC efile	\$26.95
Grant Award-Cassandra Cook	\$500.00
Grant Award-Amanda Guthrie	\$500.00
Grant Award-Zach Martin	\$200.00
Grant Award-Tony Bulmer/Genesis Graphics	\$403.00
Grant Award-Matti Hamed	\$500.00
Montclair Earth Day Event	
Snakes of Virginia Brochures:	\$287.37
Postage: Frogs of Virginia Brochures	\$5.75
Posters/Forms:	\$107.15
Spring Survey Materials:	\$18.81

Total Disbursements \$2,575.67

Current Balance –May 17, 2015 \$11,851.32

VHS Membership: 208

David Perry
VHS Secretary/Treasurer

Breaks Interstate HerpBlitz

June 12-14, 2015

Location of the Survey: Breaks Interstate Park -
<http://www.breakspark.com/>

Dates & Times:

- Saturday, June 13 – Main Survey (8AM to 3PM) – Survey wrapup (3-4PM) (See photos and captured animals from other groups)
- Sunday, June 14– Secondary Survey, VHS Members only, limited space (8AM to 12PM). The location and time to meet will be available only to VHS members.
- Please review our general guidelines for surveys. Expect to take your lunch and water with you.

Preregistration for this event is required for coordination purposes.

Contact Jason Gibson (frogman31@gmail.com) to pre-register.

Camping:

For camping reservations call (276) 865-4413.

- Those with reservations will find their check-in packet and instructions posted on the building at the entrance of the campground. Those without reservations may choose an open site and use the drop box at the woodshed for payment for that night only. If you are arriving without a reservation and wish to book a multiple night stay, visit the Camp Store if open or the reservations desk at the Rhododendron Lodge to schedule those accommodations.

Campsite options: Primitive. Electric service and water. Electric service, water, and sewer.

Campground Rates

Primitive Site: \$15 per night, plus tax

Site with electric service and water: \$22 per night, plus tax

Site with electric service, water, and sewer: \$24 per night, plus tax

Only one camper or tent and two vehicles are allowed per site. No more than six persons or immediate family members are allowed per campsite.

Field Notes

The field notes section of *Catesbeiana* provides a means for publishing natural history information on Virginia's amphibians and reptiles that does not lend itself to full-length articles. Observations on geographic distribution, ecology, reproduction, phenology, behavior, and other topics are welcomed. Field Notes will usually concern a single species. The format of the reports is: scientific name (followed by common name in parentheses), state abbreviation (VA), county and location, date(s) of observation, observer(s), data and observations. The name(s) and address(es) of the author(s) should appear one line below the report. Consult the editor if your information does not readily fit this format. All field notes must include a brief statement explaining the significance of the record (e.g., new county record) or observation (e.g., unusual or rarely observed behavior, extremely early or late seasonal record, abnormal coloration, etc.). Submissions that fail to include this information are subject to rejection. Relevant literature should be cited in the body of the text (see Field Notes in this issue for proper format). All submissions will be reviewed by the editor (and one other person if deemed necessary) and revised as needed pending consultation with the author(s).

If the field note contains information on a new county (or state) record, verification is required in the form of a voucher specimen deposited in a permanent museum (e.g., Virginia Museum of Natural History) or a photograph (print, slide, or digital image) **or recording** (digital recording of anuran calls) deposited in the archives of the Virginia Herpetological Society. Photographs and recordings should be sent to the editor for verification and archiving purposes; the identity of voucher specimens must be confirmed by a museum curator or other qualified person. Include the specimen number if it has been catalogued. Prospective authors of distribution reports should consult the VHS website (County/City Herp Lists) to determine if they may have a new county record. New distribution records from large cities that formerly constituted counties (Chesapeake, Hampton, Newport News, Suffolk, and Virginia Beach) are acceptable, but records from smaller cities located within the boundaries of an adjoining county will only be published if the species has not been recorded from that county. Species identification for observational records (e.g., behavior) should be verified by a second person whenever possible.

PHOTOGRAPHS

High contrast photographs (digital images) of amphibians and reptiles will be considered for publication if they are of good quality and are relevant to an accompanying article or field note. Published photographs will be deposited in the Virginia Herpetological Society archives.

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